

## § 56.50-97

Schedule 80 or thicker below the deepest load line.

(iii) Full penetration welds are employed in the fabrication of the structure and its attachment to the hull.

(iv) The forward end of the structure must be faired to the hull such that the horizontal length of the fairing is no less than four times the height of the structure, or be in a protected location such as inside a bow thruster trunk.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 72-59R, 37 FR 6189, Mar. 25, 1972; CGD 77-140, 54 FR 40611, Oct. 2, 1989]

### § 56.50-97 Piping for instruments, control, and sampling (modifies 122.3).

(a) Piping for instruments, control, and sampling must comply with paragraph 122.3 of ASME B31.1 (incorporated by reference; see 46 CFR 56.01-2) except that:

(1) Soldered type fittings may not be used.

(2) The outside diameter of takeoff connections may not be less than 0.840 inches for service conditions up to 900 psi or 800 °F., and 1.050 inches for conditions that exceed either of these limits.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 73-254, 40 FR 40165, Sept. 2, 1975; USCG-2003-16630, 73 FR 65178, Oct. 31, 2008]

### § 56.50-103 Fixed oxygen-acetylene distribution piping.

(a) This section applies to fixed piping installed for the distribution of oxygen and acetylene carried in cylinders as vessels stores.

(b) The distribution piping shall be of at least standard wall thickness and shall include a means, located as close to the supply cylinders as possible, of regulating the pressure from the supply cylinders to the suitable pressure at the outlet stations.

(c) Acetylene distribution piping and pipe fittings must be seamless steel. Copper alloys containing less than 65 percent copper may be used in connection with valves, regulators, gages, and other equipment used with acetylene.

(d) Oxygen distribution piping and pipe fittings must be seamless steel or copper.

(e) When more than two cylinders are connected to a manifold, the supply pipe between each cylinder and mani-

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fold shall be fitted with a non-return valve.

(f) Except for the cylinder manifolds, acetylene is not to be piped at a pressure in excess of 100 kPa (14.7 psi).

(g) Pipe joints on the low pressure side of the regulators shall be welded.

(h) Branch lines shall not run through unventilated spaces or accommodation spaces.

(i) Relief valves or rupture discs shall be installed as relief devices in the piping system if the maximum design pressure of the piping system can be exceeded. The relief device set pressure shall not exceed the maximum design pressure of the piping system. Relief devices shall discharge to a location in the weather at least 3 m (10 ft) from sources of ignition or openings to spaces or tanks.

(j) Outlet stations are to be provided with suitable protective devices which will prevent the back flow of gas into the supply lines and prevent the passage of flame into the supply lines.

(k) Shutoff valves shall be fitted at each outlet.

[CGD 95-028, 62 FR 51201, Sept. 30, 1997]

### § 56.50-105 Low-temperature piping.

(a) *Class I-L.* Piping systems designated to operate at temperatures below 0 °F. and pressures above 150 pounds per square inch gage shall be of Class I-L. Exceptions to this rule may be found in the individual requirements for specific commodities in subchapters D, I, and O of this chapter. The following requirements for Class I-L piping systems shall be satisfied:

(1) *Materials.* All materials used in low temperature piping systems shall be selected from among those specifications listed in Table 56.50-105 and shall satisfy all of the requirements of the specifications, except that:

(i) The minimum service temperature as defined in § 54.25-10(a)(2) of this subchapter shall not be colder than that shown in Table 56.50-105; and

(ii) The material shall be tested for low temperature toughness using the Charpy V-notch specimen of ASTM E 23 (incorporated by reference, see § 56.01-2), "Notched Bar Impact Testing of Metallic Materials", Type A, Figure 4. The toughness testing requirements of subpart 54.05 of this subchapter shall

be satisfied for each particular product form. Charpy V-notch tests shall be conducted at temperatures not warmer than 10 °F. below the minimum service temperature of the design, except that for service temperatures of –320 °F. and below, the impact test may be conducted at the service temperature. The minimum average energy shall not be less than that shown in Table 56.50–105. In the case of steels conforming to the specifications of Table 54.25–20(a) of this subchapter the minimum lateral expansion shall not be less than that required in § 54.25–20 of this subchapter. The minimum energy permitted for a single specimen and the minimum subsize energies shall be those obtained by multiplying the average energy shown in Table 56.50–105 by the applicable fraction shown in Table 56.50–105(a).

TABLE 56.50–105(a)—CHARPY V-NOTCH  
ENERGY MULTIPLYING FACTORS

Charpy V-notch specimen size <sup>1</sup>	Factor for minimum energy, average of 3 specimens <sup>1</sup>	Factor for minimum energy single specimen <sup>1</sup>
10×10 mm .....	1	2/3
10×7.5 mm .....	5/6	5/9
10×5.0 mm .....	2/3	4/9
10×2.5 mm .....	1/2	1/3

<sup>1</sup> Straight line interpolation for intermediate values is permitted.

(iii) Steels equivalent to those listed in Table 56.50–105 of this part, but not produced according to a particular ASTM specification, may be used only with the prior consent of the Marine Safety Center. Steels differing in chemical composition, mechanical properties or heat treatments from those specified may be specially approved by the Marine Safety Center. Similarly, aluminum alloys and other nonferrous materials not covered in Table 56.50–105 of this part may be specifically approved by the Marine Safety Center for service at any low temperature. There are restrictions on the use of certain materials in this part and in subchapter O of this chapter.

(2) *Piping weldments.* Piping weldments shall be fabricated to satisfy the requirements of § 57.03–1(b) of this subchapter in addition to subpart 56.70. Toughness testing of production weldments for low temperature piping systems and assemblies is not required.

(3) *Postweld heat treatment.* All piping weldments shall be postweld heat treated for stress relief in accordance with the procedures of subpart 56.85. The only exceptions to this requirement are for materials which do not require postweld heat treatment as shown in Table 56.85–10. Relief from postweld heat treatment shall not be dependent upon pipe thickness or weld joint type.

(4) *Nonacceptable joints.* Single welded butt joints with backing ring left in place, socket welds, slip-on flanges, pipe joining sleeves, and threaded joints shall not be used, except in small diameter instrument lines.

(5) *Other requirements.* All other requirements of this part for Class I piping apply to Class I-L piping. Pressure testing must comply with subpart 56.97 of this part, and nondestructive testing of circumferentially welded joints must comply with § 56.95–10. Seamless tubular products must be used except that, when the service pressure does not exceed 1724 KPa (250 psi), the Commanding Officer, Marine Safety Center, may give special consideration to appropriate grades of piping and tubing that are welded without the addition of filler metal in the root pass. Each production procedure and quality-control program for welded products must be acceptable to the Officer in Charge, Marine Inspection.

(b) *Class II-L.* Piping systems designed to operate at temperatures below 0 °F. and pressures not higher than 150 pounds per square inch gage shall be of Class II-L. Exceptions to this rule may be found in the individual requirements for specific commodities in subchapter D (Tank Vessels) and I (Cargo and Miscellaneous Vessels) of this chapter. The following requirements for Class II-L piping systems shall be satisfied:

(1) Materials must be the same as those required by paragraph (a)(1) of this section except that pipe and tubing of appropriate grades welded without the addition of a filler metal may be used. The Commandant may give special consideration to tubular products welded with the addition of filler metal.

(2) Piping weldments shall be fabricated to satisfy the requirements of

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§ 57.03–1(b) of this subchapter in addition to subpart 56.70. Toughness testing of production weldments for low temperature piping systems and assemblies is not required.

(3) All piping weldments shall be postweld heat treated for stress relief in accordance with the procedures of subpart 56.85. The only exceptions to this requirement are for materials which do not require postweld heat treatment as shown in Table 56.85–10 and for socket weld joints and slip-on flange weld attachments where the weld thickness does not exceed that exempted by this table. Otherwise, relief

from post-weld heat treatment shall not be dependent upon pipe thickness or weld joint type.

(4) Socket welds in nominal sizes above 3 inches, slip-on flanges in nominal sizes above 4 inches, and threaded joints in sizes above 1 inch shall not be used.

(5) Pressure testing must comply with Subpart 56.97, and nondestructive testing of welded joints must comply with § 56.95–10.

(6) All other requirements contained in this part for Class II piping shall be applicable to Class II-L systems, except that § 56.70–15(b)(3)(iv) shall not apply.

TABLE 56.50–105—ACCEPTABLE MATERIALS AND TOUGHNESS TEST CRITERIA <sup>2</sup>

Product form	ASTM specification <sup>3</sup>	Grade <sup>4</sup>	Minimum service temperature	Minimum avg Charpy V notch energy
Pipe .....	A–333 and A–334 .....	1 .....	– 30 °F .....	20 ft. lb.
Tube (carbon and low alloy steels).		3 .....	– 150 °F .....	25 ft. lb.
		4 (A–333 only) .....	– 100 °F .....	25 ft. lb.
		6 .....	– 30 °F .....	20 ft. lb.
		7 .....	– 100 °F .....	25 ft. lb.
		8 .....	– 320 °F .....	Refer to § 54.25–20 of this subchapter.
Pipe (Austenitic stainless steel).	A–312 .....	All Grades .....	No limit .....	Austenitic stainless steel piping need be impact tested only when toughness tests are specified in subpart 54.25 of this subchapter for plating of the same alloy designation. When such toughness tests are required, the minimum average energy is 25 ft. lb.
Wrought welding fittings (carbon and low alloy steels).	A–420 .....	WPL1 .....	– 30 °F .....	20 ft. lb.
Forged or rolled flanges, forged fittings, valves and pressure parts (carbon and low alloy steels).		WPL3 .....	– 150 °F .....	25 ft. lb.
		WPL4 .....	– 100 °F .....	25 ft. lb.
	A–350 <sup>1</sup> .....	LF1 .....	– 30 °F .....	20 ft. lb.
A–182 .....		LF2 .....	– 30 °F .....	20 ft. lb.
		LF3 .....	– 150 °F .....	25 ft. lb.
	LF4 .....	– 100 °F .....	25 ft. lb.	
Forged or rolled flanges, forged fittings, valves and pressure parts (high alloy steels).	A–182 .....	Austenitic grades only (304, 304H, 304L, 310, 316, 316H, 316L, 321, 321H, 347, 347H, 348, 348H).	No limit .....	These products need be impact tested only when toughness tests are specified in subpart 54.25 of this subchapter for plating of the same alloy designation. When such toughness tests are required, the minimum average energy is 25 ft. lb.
Forged flanges, fittings, and valves (9% nickel).	A–522 .....	9% Ni .....	– 320 °F .....	Refer to § 54.25–20 of this subchapter.
Castings for valves and pressure parts (carbon and low alloy steels).	A–352 <sup>1</sup> .....	LCB .....	– 30 °F .....	20 ft. lb.
		LC1 .....	– 50 °F .....	20 ft. lb.
		LC2 .....	– 100 °F .....	25 ft. lb.
		LC3 .....	– 150 °F .....	25 ft. lb.

TABLE 56.50-105—ACCEPTABLE MATERIALS AND TOUGHNESS TEST CRITERIA<sup>2</sup>—Continued

Product form	ASTM specification <sup>3</sup>	Grade <sup>4</sup>	Minimum service temperature	Minimum avg Charpy V notch energy
Castings for valves and pressure parts (high alloy steel).	A-351 .....	Austenitic grades CF3, CF3A, CF8, CF8A, CF3M, CF8M, CF8C, CK20 only.	No limit, except –325 °F for grades CF8C and CK20.	No toughness testing required except for service temperatures colder than –425 °F for grades CF3, CF3A, CF8, CF8A, CF3M, and CF8M. 25 ft. lb. average must be attained in these tests.
Bolting .....	A-320 .....	L7, L9, L10, L43 ..... B8D, B8T, B8F, B8M ... 2B8, B8C .....	–150 °F ..... –325 °F ..... No limit .....	20 ft. lb. No test required. No test required, except for service temperatures colder than –425 °F. In such case the minimum average energy is 25 ft. lb.
Nuts, bolting .....	A-194 .....	4 ..... 8T, 8F ..... 8, 8C .....	–150 °F ..... –325 °F ..... No limit .....	20 ft. lb. No test required. Same requirement as comparable grades (B8, B8C) of bolting listed above.

<sup>1</sup> Quench and temper heat treatment may be permitted when specifically authorized by the Commandant. In those cases the minimum average Charpy V-notch energy shall be specially designated by the Commandant.

<sup>2</sup> Other material specifications for product forms acceptable under part 54 for use at low temperatures may also be used for piping systems provided the applicable toughness requirements of this Table are also met.

<sup>3</sup> Any repair method must be acceptable to the Commandant CG-ENG, and welding repairs as well as fabrication welding must be in accordance with part 57 of this chapter.

<sup>4</sup> The acceptability of several alloys for low temperature service is not intended to suggest acceptable resistance to marine corrosion. The selection of alloys for any particular shipboard location must take corrosion resistance into account and be approved by the Marine Safety Center.

NOTE: The ASTM standards listed in table 56.50-105 are incorporated by reference; see 46 CFR 56.01-2.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 72-59R, 37 FR 6189, 6190, Mar. 25, 1972; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CG 79-108, 43 FR 46545, Oct. 10, 1978; CGD 74-289, 44 FR 26008, May 3, 1979; CGD 77-140, 54 FR 40611, Oct. 2, 1989; CGD 83-043, 60 FR 24775, May 10, 1995; USCG-2000-7790, 65 FR 58460, Sept. 29, 2000; USCG-2003-16630, 73 FR 65178, Oct. 31, 2008; USCG-2009-0702, 74 FR 49228, Sept. 25, 2009; USCG-2012-0832, 77 FR 59777, Oct. 1, 2012]

#### § 56.50-110 Diving support systems.

(a) In addition to the requirements of this part, piping for diving installations which is permanently installed on the vessel must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

(b) Piping for diving installations which is not permanently installed on the vessel need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

(c) Piping internal to a pressure vessel for human occupancy (PVHO) need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

[CGD 76-009, 43 FR 53683, Nov. 16, 1978]

#### Subpart 56.60—Materials

##### § 56.60-1 Acceptable materials and specifications (replaces 123 and Table 126.1 in ASME B31.1).

(a)(1) The material requirements in this subpart shall be followed in lieu of